

Lesson Overview

After identifying the chemicals that could pose a threat to your jurisdiction, you will need to analyze your jurisdiction's vulnerability to the hazards. In other words, how vulnerable is your jurisdiction to an incident involving one of these chemicals?

At the end of this lesson, you should be able to identify the areas of your jurisdiction that are most vulnerable to a HazMat incident.

Conducting a Vulnerability Analysis

An important question to ask is: How vulnerable is your jurisdiction to the hazards identified? Conducting a vulnerability analysis will help you to identify:

- The areas that would be most affected by a chemical spill or release.
- At-risk populations within the zone.
- At-risk critical facilities in the area.

Examine a map of your jurisdiction when analyzing vulnerability. Relying on your memory is a sure way to miss something critical. Referring to a map will help you to identify your real risks in terms of people, property, and the environment.

Steps in the Vulnerability Analysis Process

Vulnerability analysis involves four steps:

1. Develop a Hazard Profile.
2. Check Assumptions.
3. Develop a Jurisdiction Profile.
4. Identify vulnerable areas.

At the end of this process, you should know the areas of your jurisdiction that are most vulnerable should a HazMat spill or release occur.

Each of these steps will be described in this lesson.

Step 1: Develop a Hazard Profile

Begin the vulnerability analysis by developing a hazard profile for each type of incident. The hazard profile should include the information below for each:

- **Frequency.** How often has an incident involving this hazard occurred in the past?
 - **Magnitude and potential intensity.** How bad could it get? Is an incident involving this chemical more dangerous or complex depending on the season?
 - **Location.** Are some areas more likely to have an incident?
 - **Probable spatial extent.** Will the incident spread? How and how far?
 - **Speed of onset.** How fast would an incident threaten lives and property?
 - **Availability of warning.** Is there a way to warn against this type of incident?
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Step 2: Check Assumptions

Vulnerability analyses are based on assumptions about what could happen. When checking assumptions, consider factors such as the:

- **Nature of the hazard posed by the chemical.** For example, will a spill involving chemical X produce a toxic plume?
- **Quantity involved.** For example, is a spill likely to involve 8 gallons or 8,000?
- **Surrounding topography.** For example, is a spill likely to contaminate a nearby river?

Changing the assumptions can significantly alter the area that could be affected.

Assumptions Affect Vulnerability

Altering assumptions, such as the amount of chemical released, the timeframe, weather conditions, or other factors may affect the size of the areas affected by a release. For example:

- If the quantity of a chemical stored onsite is reduced, the total quantity that could be released is also reduced. This results in a smaller vulnerable area.
- If the time period assumed for the release of a specific amount of chemical increases, the vulnerable area will become smaller as a result of the reduced amount of chemical released per minute.

Be sure to check your assumptions when defining vulnerable areas.

Step 3: Develop a Jurisdiction Profile

The next step in identifying vulnerabilities is to develop a jurisdiction profile. A jurisdiction profile facilitates threat determination for the entire jurisdiction or for a specific area.

A [jurisdiction profile](#) is a map that identifies:

- The locations of known hazards.
 - Major structures and geographic features.
 - Areas and features requiring an immediate response (e.g., population concentrations, critical facilities, water supplies).
 - Manmade and natural boundaries for dividing the jurisdiction into sectors.
 - Time of day, day of week, and seasonal shifts for school, work, and/or tourists who are potentially at risk.
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Step 4: Identify Vulnerable Areas

The final step is to identify vulnerable areas. To identify vulnerable areas, you will need information about:

- How toxic the substance is (also called the “level of concern”).
- How much could be released.
- The rate of release.

Mark the vulnerable area(s) on the jurisdiction profile by marking the area with a circle. Be sure to account for conditions, such as the prevailing wind pattern and typical temperatures, when determining vulnerable areas. Then, look at the areas marked to identify critical facilities, topographic features, and other factors that pose special risks should an incident occur in those areas.

Lesson Summary

Analyzing vulnerability will provide information about:

- The areas that would be most affected by a chemical spill or release.
- At-risk populations within the vulnerable area.
- At-risk critical facilities within the vulnerable area.

Vulnerability analysis involves four steps:

1. Developing a hazard profile.
 2. Checking assumptions.
 3. Developing a jurisdiction profile.
 4. Identifying vulnerable areas.
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